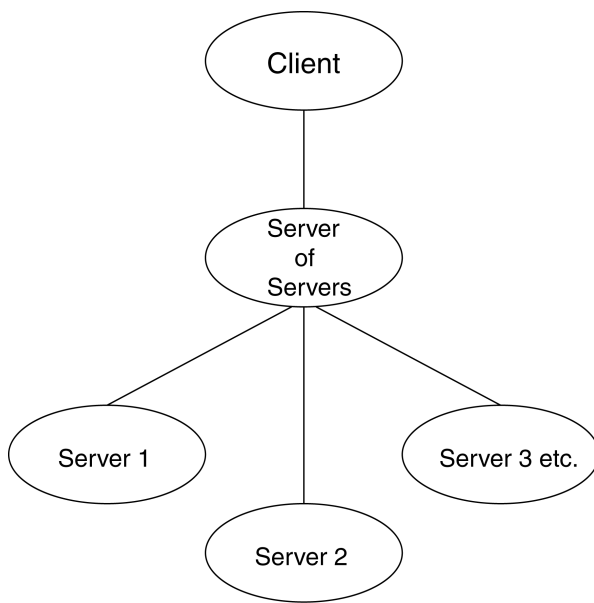




## INTRODUCTION

EnSight7 (with gold license key) has the capability of dealing with partitioned data in an efficient distributed manner by utilizing what we call a server-of-servers (SOS for short). An SOS server resides between a normal client and a number of normal servers. Thus, it appears as a normal server to the client, and as a normal client to the various normal servers.



This arrangement allows for distributed parallel processing of the various portions of a model, and has been shown to scale quite well.

*Note: EnSight SOS provided with release 7.6 does not yet support transient particle tracing (pathlines), but does support steady state tracing (streamlines).*

Currently, EnSight SOS capability is only available for EnSight5, EnSight6, EnSight Gold, Plot3d, and any EnSight User-Defined Reader data. (It is not directly available for Fidap Neutral, Fluent Universal, N3S, Estet, MPGS4, Movie, Ansys, Abaqus, or FAST Unstructured data.)

Please recognize that your data must be partitioned in some manner (hopefully in a way that will be reasonably load balanced) in order for this approach to be useful. (The exception to this is the use of the auto\_distribute capability for structured data. This option can be used if the data is structured and is available to all servers defined. It will automatically distribute each portions of each structured block over the defined servers - without the user having to partition the data.)

*(Included in the EnSight distribution is an unsupported utility that will take most EnSight Gold binary unstructured datasets and partition it for you. The source for this utility (called "chopper") can be found in the \$CEI\_HOME/ensight76/unsupported/partitioner directory.)*

Note: If you do your own partitioning of data into EnSight6 or EnSight Gold format, please be aware that each part must be in each partition - but, any given part can be "empty" in any given partition. (All that is required for an empty part is the "part" line, the part number, and the "description" line.)

You should place each partitioned portion of the model on the machine that will compute that portion. Each partitioned portion is actually a self contained set of EnSight data files, which could typically be read by a normal client - server session of EnSight. For example, if it were EnSight gold format, there will be a casefile and associated gold geometry and variable results file(s). On the machine where the EnSight SOS will be run, you will need to place the sos casefile. The sos casefile is a simple ascii file which informs the SOS about pertinent information needed to run a server on each of the machines that will compute the various portions.

The format for this file is as follows: (Note that [ ] indicates optional information, and a blank line or a line with # in the



first column are comments.)

**FORMAT** (Required)

**type: master\_server datatype** (Required)

where: **datatype** is required and is one of the formats of EnSight's internal readers (which use the Part builder), namely:

**gold      ensight6      ensight5      plot3d**

or it can be the string used to name any of the user-defined readers.

Note: For user-defined readers, the string must be exactly that which is defined in the USERD\_get\_name\_of\_reader routine of the reader (which is what is presented in the Format pulldown of the Data Reader dialog).

If **datatype** is blank, it will default to EnSight6 data type.

**[auto\_distribute: on/off]** (Optional for structured, Ignored for unstructured)

For structured data only, EnSight will automatically distribute data to the servers specified below if this option is present and set to "on". This will require that each of the servers have access to the same data (or identical copies of it).

**[plot3d\_iblanked: true/false]** (Required only if **datatype** is plot3d)

**[plot3d\_multi\_zone: true/false]** (Required only if **datatype** is plot3d)

**[plot3d\_dimension: 1d/2d/3d]** (Required only if **datatype** is plot3d)

**[plot3d\_source: ascii/cbin/fortran/bin]** (Required only if **datatype** is plot3d)

**[plot3d\_grid\_double: true/false]** (Required only if **datatype** is plot3d)

**[plot3d\_results\_double: true/false]** (Required only if **datatype** is plot3d)

where: iblanking, multi\_zone, dimension, source type, grid file double precision, and results file double precision information should be provided. If it is not provided, it will default to the following (which is likely not to be correct):

plot3d_iblanked:	false
plot3d_multi_zone:	false
plot3d_dimension:	3d
plot3d_source:	cbin
plot3d_grid_double:	false
plot3d_results_double:	false

## NETWORK\_INTERFACES

(Note: This whole section is optional. It is needed only when more than one network interface to the sos host is available and it is desired to use them. Thus, distributing the servers to sos communication over more than one network interface)

**number of network interfaces: num** (Required - if section used)

where: **num** is the number of network interfaces to be used for the sos host.

**network interface: sos\_network\_interface\_name\_1** (Required - if section used)

**network interface: sos\_network\_interface\_name\_2** (Required - if section used)

**network interface: sos\_network\_interface\_name\_num** (Required - if section used)

**SERVERS** (Required)

**number of servers: num** (Required)

where: **num** is the number of servers that will be started and run concurrently.

**#Server 1** (Comment only)

**machine id: mid** (Required)

where: **mid** is the machine id of the server.

**executable: /.../ensight7.server** (Required, must use full path)

**[directory: wd]** (Optional)

where: **wd** is the working directory from which ensight7.server will be run

**[login id: id]** (Optional)

where: **id** is the login id. Only needed if it is different on this machine.

**[data\_path: /.../dd]** (Optional)

where: **dd** is the directory where the data resides. Full path must be provided if you use this line.

**casefile: yourfile.case** (Required, but depending on format, may vary as to whether it is a casefile, geometry file,



[resfile: *yourfile.res*]

neutral file, universal file, etc. Relates to the first data field of the Data Reader Dialog.)  
(Depends on format as to whether required or not. Relates to the second data field of the Data Reader Dialog.)

[measfile: *yourfile.mea*]

(Depends on format as to whether required or not. Relates to the third data field of the Data Reader Dialog.)

[bndfile: *yourfile.bnd*]

(Depends on format as to whether required or not. Relates to the fourth data field of the Data Reader Dialog.)

--- Repeat pertinent lines for as many servers as declared to be in this file ---

## BASIC OPERATION

To use Server of Servers, you must:

1. Partition your data, and distribute it (or make it available) to the various machines on which you will run servers.  
(Or if you have structured data, you can use the `auto_distribute` option in the `sos` casefile.)
2. Create the `sos` casefile, which defines the server machines, the location of server executables on those machines, and the name and location of the partitioned data for the servers.
3. Use `EnSight7.sos` in place of `EnSight7.server`, and provide it with the `sos` casefile.

### Example SOS Casefile

This example deals with a `EnSight Gold` dataset that has been partitioned into 3 portions, each running on a different machine. The machines are named `joe`, `sally`, and `bill`. The executables for all machines are located in similar locations, but the data is not. Note that the optional `data_path` line is used on two of the servers, but not the third.

```

FORMAT
type: master_server gold

SERVERS
number of servers: 3

#Server 1
machine id: joe
executable: /usr/local/bin/ensight76/bin/ensight7.server
data_path: /usr/people/john/data
casefile: portion_1.case

#Server 2
machine id: sally
executable: /usr/local/bin/ensight76/bin/ensight7.server
data_path: /scratch/sally/john/data
casefile: portion_2.case

#Server 3
machine id: bill
executable: /usr/local/bin/ensight76/bin/ensight7.server
casefile: /scratch/temp/john/portion_3.case

```

If we name this example `sos` casefile - "`all.sos`", and we run it on yet another machine - one named `george`, you would want the data distributed as follows:

On <code>george</code> :	<code>all.sos</code>
On <code>joe</code> (in <code>/usr/people/john/data</code> ):	<code>portion_1.case</code> , and all files referenced by it.
On <code>sally</code> (in <code>/scratch/sally/john/data</code> ):	<code>portion_2.case</code> , and all files referenced by it.
On <code>bill</code> (in <code>/scratch/temp/john</code> ):	<code>portion_3.case</code> , and all file referenced by it.

By starting `EnSight` with the `-sos` command line option (which will autoconnect using `ensight7.sos` instead of `ensight7.server`), or by manually running `ensight7.sos` in place of `ensight7.server`, and providing `all.sos` as the casefile to read in the Data Reader dialog - `EnSight` will actually start three servers and compute the respective portions on them in parallel.



### Optional NETWORK\_INTERFACES section notes

If the machine named george had more than one network interface (say it had its main one named george, but also had one named george2), we could add the section shown below to our casefile example:

```
NETWORK_INTERFACES
number of network interfaces: 2
network interface: george
network interface: george2
```

This would cause machine joe to connect back to george, machine sally to connect back to george2, and machine bill to connect back to george. This is because the sos will cycle through its available network interfaces as it connects the servers. Remember that this is an optional section, and most users will probably not use it. Also, the contents of this section will be ignored if the `-soshostname` command line option is used.

### Example SOS Casefile for PLOT3D, Using auto\_distribute

This example shows a plot3d dataset (post.x and post.q) that has not been partitioned, but is on an nfs mounted disk available to each server machine. EnSight will distribute the data to the 3 servers defined. IO will not necessarily be great since each server will be reading from the same file, but execution will be enhanced by the partitioning. We will use the same machines used in the previous example.

```
FORMAT
type: master_server plot3d
auto_distribute: on
plot3d_iblanked: true
plot3d_multi_zone: false
plot3d_dimension: 3d
plot3d_source: cbin
plot3d_grid_double: false
plot3d_results_double: false

SERVERS
number of servers: 3

#Server 1
machine id: joe
executable: /usr/local/bin/ensight76/bin/ensight7.server
data_path: /scratch/data
casefile: post_x
resfile: post.q

#Server 2
machine id: sally
executable: /usr/local/bin/ensight76/bin/ensight7.server
data_path: /scratch/data
casefile: post.x
resfile: post.q

#Server 3
machine id: bill
executable: /usr/local/bin/ensight76/bin/ensight7.server
data_path: /scratch/data
casefile: post.x
resfile: post.q
```

## SEE ALSO

[How To Read Data](#)

[How To Read EnSight Gold Data](#)

[How To Read EnSight 6 Data](#)

[How To Read User Defined](#)

User Manual: [Server-of-Server Casefile Format](#)